Claims

1. A purified thermostable DNA polymerase obtainable from *Thermococcus gorgonarius* which catalyses the template directed polymerisation of DNA, possesses 3'-5'-exonuclease (proofreading) activity and is characterised by at least a two-fold greater replication fidelity than DNA polymerase obtainable from *Pyroccoccus furiosus*.

2. A purified thermostable DNA polymerase according to claim 1 which retains about 90 % of its activity after incubation for two hours at about 95°C in the presence of a stabilizer.

3. The polymerase as claimed in any one of claims 1 - 2, wherein said polymerase has an apparent molecular weight between about 92 000 to 96 000 daltons.

4. The polymerase as claimed in any one of claims 1 - 3, wherein said polymerase is obtainable from E.coli.

5. A stabilized composition consisting of a polymerase as claimed in any one of claims 1 - 4 and a stabilizer.

6. The composition according to claims 1 - 5, wherein said stabilizer is a non-ionic detergent.

7. The composition according to claim 1 - 6, wherein Thesit and/or Nonident P 40 serve as stabilizer.

8. An isolated DNA sequence coding for the polymerase according to any one of claims 1 - 7 obtainable from *Thermococcus gorgonarius*.

9. An isolated DNA sequence coding for the polymerase as claimed in claim 8 contained within the plasmid pBTac2Tgo.

10. An isolated DNA sequence of claim 9 contained within an approximately 2.3 kB EcoRI/PstI restriction fragment of plasmid pBTac2Tgo.

11. An isolated DNA sequence represented by the formula shown in SEQ ID No. 6.

12. A vector containing the isolated DNA sequence as claimed in any one of claims 8 - 11.

13. The vector of claim 12, wherein such vector is plasmid pBTac2Tgo.

14. The vector according to claims 12 and 13 providing some or all of the following features:
    (1) promotors or sites of initiation of transcription

(2) operators which could be used to turn gene expression on or off

(3) ribosome binding sites for improved translation

(4) transcription or translation termination sites.

15. A microbial host transformed with the vector of claims 12 - 14.

16. A microbial host according to claim 15 wherein said host is from *E. coli* LE 392 pUBS 520 and designated *E.coli* pBtac2Tgo.

17. A process for the preparation of DNA polymerase according to any one of claims 1 - 7 comprising the steps:

(a) cultering the natural strain *Thermococcus gorgonarius*

(b) suspending the cells of the natural cells in buffer

(c) disrupting the cells

(d) purifying the DNA polymerase by several chromatographic steps.

18. A process for the preparation of DNA polymerase according to any one of claims 1 - 7 comprising growing a microbial host strain according to claims 15 or 16 and purifying the DNA polymerase therefrom.

19. A process for amplifying DNA, characterized in that a thermostable DNA polymerase according to any one of claims 1 - 7 is used.

20. A process for DNA sequencing or DNA labelling, characterized in that a thermostable DNA polymerase according to any of the claims 1 - 7 is used wherein the 3'-5' exonuclease activity of said DNA polymerase is inactivated.

21. A process for second cDNA cloning and DNA sequencing, characterized in that a thermostable DNA polymerase according to any one of claims 1 - 7 is used.

22. A process for DNA sequencing, characterized in that a thermostable DNA polymerase according to any one of claims 1 - 7 is used.